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V. *Any number divided by 7 leaves the same remainder as the difference of the sums of the odd numerical periods and the even numerical periods divided by 7.* If the sum of the even periods is the greater we subtract the remainder from 7 for the true remainder, as in the similar case of the principle for 11.

The second, third, and fourth principles, as here presented, are derived from the first, though they may be demonstrated independently. The arithmetical demonstration of Prin. V. leads to a still more general law of divisibility, since the factor 1001, which will be seen to be the basis of the demonstration, is the product of 7, 11, and 13. The principle is thus seen to be true for 11 and 13 and the most general form of statement is as follows:

VI. *Any number, divided by 7, 11, or 13, leaves the same remainder as is obtained when the sum of the odd numerical periods minus the sum of the even numerical periods is divided by these numbers.*

From this we may immediately derive the law of exact divisibility by 7, 11, and 13, namely:

VII. *Any number is divisible by 7, 11, and 13 when the difference between the sums of the odd and even numerical periods is divisible by these numbers.*

Subsequent to the discovery of Prin. II., I learned that Prof. Elliott had employed the same property as early as 1846; whether it was known previously to this date has not been ascertained. I have also recently noticed that Prin. III. is given by one or two writers, but with whom it originated I am not aware. The other two laws, so far as I can learn, have not been previously published.

HISTORICAL SKETCH OF AMERICAN MATHEMATICAL PERIODICALS.

BY DAVID S. HART M. D., STONINGTON, CONN.

From the settlement of the American Colonies to the commencement of the present century, but little attention was paid to Science and especially to mathematical Science. Many of the early settlers of the Colonies, and particularly the Clergy, were among the most eminent classical scholars in the world. Many of them had carried off the palm of victory at Oxford and Cambridge in England. Latin and Greek, and in some instances Hebrew, were as familiar to them as their native tongue. Some of them had even mastered the Chaldee, Syriac and Arabic languages. Theological speculation was indulged in to a great extent. In mathematics, on the other hand,

little more than the elements of Algebra, Geometry and Astronomy taught in the Colleges, such for instance as Harvard and Yale. The Differential and Integral Calculus, and others of the higher branches of mathematics were known only to the "chosen few." In these studies America was far behind Europe. But, at the beginning of this century, several gentlemen in New York and other cities, who had long felt the want of a periodical which should do for America what the "Ladies' Diary" had for a century done for England, resolved to form an association for that purpose. They established a periodical styled "The Mathematical Correspondent" to be published quarterly in numbers containing only one sheet. Several editors were appointed, of whom George Baron was Editor in chief. The first number was issued in New York, May 1st, 1804. Eight numbers only were published, which were bound as Vol. I. In this volume there was a supplementary number containing two essays, one of which was on the Diophantine Analysis by Robert Adrain. This was the first attempt to introduce the study of this refined analysis in America. He intended to continue the subject in the next volume; but alas! that volume never appeared.

The causes of the discontinuance of this periodical are obvious even upon a slight examination. In the first place, the Editors permit a contributor who calls himself A. Rabbit, to sneer at several works written by American authors, as Shepherd, Pike, Walsh and others. They themselves also speak in the most contemptuous manner of Col. Jared Mansfield, superintendent of the Military Academy at West Point. The writer has a copy of No. 2. stitched in a blue cover, on which is an advertisement of a Lecture delivered in New York by G. Baron, which contains (as he says) "a complete refutation of the false and spurious principles, ignorantly imposed on the public, in the 'New American Practical Navigator,' written by N. Bowditch and published by E. M. Blunt." The sub-editors endorsing the above say, "We agree with the author that he has shown in the most incontrovertible manner, that the principles on which the 'New American Practical Navigator' is founded, are universally false, and gross impositions on the public."

It may be remarked here that these Editors, being of Hibernian descent, were prejudiced against American authors. The two authors last mentioned, the one by his "Practical Navigator," or "Epitome," and the other by his "American Coast Pilot," have done more for the interests of sea-faring men than all other authors combined. The former in particular, Nathaniel Bowditch L.L. D., for years before his death, stood at the head of American Mathematicians.

Mr. A. Rabbit, on p. 142, says: "The contents of p. 203 of the 'Columbian Accountant,' sung to the tune of 'The pump of Lake Champlain' will

completely exhibit the stupidity of Shepherd's rule mentioned in the quest." And in a foot-note he says; "The theological properties of this wonderful pump have, I understand, been sufficiently investigated by the members of a certain church in New York, and I promise to unfold the mathematical principles of the same in some future number."

It is difficult at this late day to see the point of all this, but it probably is a covert sneer at Mr. Shepherd and his friends.

The editor, on p. 154, says; "A. Rabbit will not in any future number, be permitted to propose questions concerning the blunders of stupid Shepherds; we had rather soar aloft with the eagle, than waddle in mud with a goose."

On p. 174, it is stated by the sub-editors, that "the *health* of Mr. Baron, our principal editor, was, last summer, entirely destroyed by three of the understrappers of the *Health Committee*. Deprived of his assistance, we earnestly solicit our contributors to endeavor to render their solutions as perfect as possible." The cause assigned for the retirement of Mr. Baron from his position is as enigmatical as the riddle of the Sphynx, or a Delphic Oracle.

At this time many of the subscribers neglected to pay, and the editors threatened to publish their names, but the threat was not carried into execution, and the paper soon died out. The principal contributors were, besides Mr. Baron, Robert Adrain, Rev. T. P. Irving, Wm. Lenhart, John Smithis, Thomas Maughan, John D. Craig, John Capp, Diarius Yankee, N. Young, Walter Folger Jr., James Temple, Ebenezer R. White, Richard Tagart, &c.

The next periodical was "The Analyst, or Mathematical Museum." It was edited by Robert Adrain A. M., Professor of Mathematics and Natural Philosophy in Columbia College, New York. It appears to have been published both at Philadelphia and New York. The first number was issued in 1808. Five numbers were published; how often does not appear. The writer has never seen this periodical and the above are all the particulars he has been able to collect. It appears however that, besides the Editor, Nathaniel Bowditch, Alexander M. Fisher, Melatiah Nash, William Brown, (and probably others who had been contributors to the "Math'l Correspondent") were among the contributors to "The Analyst."

In 1818, Mr. William Marrat became editor of "The Scientific Journal," which was published at Perth Amboy, N. J., in monthly numbers; nine numbers are all that are known to have been issued, seven continuously, in 1818, from February to August inclusive, and two in 1819, viz., in July and October. The above are all the particulars that the writer has been able to collect in regard to this periodical.

The next year, 1820, Melatiah Nash became editor of "The Ladies and Gentlemen's Diary, or United States Almanac, and Repository of Science and Amusement." It was published in New York, annually of course. Besides the Almanac it contained an Ephemeris of the Sun, Moon and Planets, much valuable information in Astronomy and Philosophy, Enigmas, Charades, Rebuses, Queries and Mathematical Problems to be answered in the succeeding numbers. From a statement on pp. 62, No. I. and 77, No. III. it appears that the reason Mr. Marrat discontinued "The Scientific Journal" was, his leaving the United States, for Liverpool, England. In the same number he unites with Dr. Adrain, and others, in commending the enterprise of Mr. Nash to the patronage of the public. Only three nos. were issued. Severe and long continued sickness in his family compelled Mr. Nash to abandon the enterprise. This result was much regretted by the Scholars of that day; for he was an able man, in fact, the right man in the right place. The chief contributors to the mathematical department were Wm. Marrat of Liverpool, Eng., Dr. Bowditch, Walter Folger, John Macauley of Liverpool, J. H. Swale of do. John Capp, John D. Craig, Mr. Nash, the Editor, John Gough and Thomas Gaskin of Kendal, Eng. The latter was a youth of eleven years and a prodigy in mathematical science, considering his age.

In 1825, three years after the discontinuance of Nash's Diary, Robert Adrain LL. D., again appears as an Editor of a Mathematical periodical. He was then Professor of Mathematics and Natural Philosophy in Columbia College, N. Y., as he had been for many years. He was Editor of "The Mathematical Diary," which was, for the first two years, published quarterly, and for the five succeeding years, annually. Thirteen numbers were issued; the last being a double number, so that in fact there were fourteen numbers. The first number of "The Diary" was issued Jan., 1825, and the last, March, 1832. This number contains an excellent likeness of Joseph Louis LaGrange, and an interesting sketch of his life.

Dr. Adrain continued in the editorship but one year. He had accepted the position of Professor in Rutgers' College, New Brunswick, N. J., and was therefore obliged to retire from the Diary. His successor was James Ryan A. M., the author of several valuable mathematical works. For six years he ably conducted The Diary, and he would have continued to do so for many years longer, but for an unfortunate quarrel among the mathematicians. Mr. Samuel Ward 3rd, a recent graduate of Columbia College, had in part the management of the last number. In it he caused to be inserted a Dialogue, written by himself, wherein he exhibits in a ridiculous light, Dr. Henry J. Anderson, then Mathematical Professor in Columbia College.

It contains also short notices of recent mathematical works. Both the Editor and Dr. Anderson were highly indignant at this performance. The parties met at the mathematical book-store of James Ryan, and high words passed between the parties and their friends. The result was the complete breaking up of "The Diary," which was probably not intended nor anticipated by Mr. Ward. This gentleman was afterward the editor of "Young's Algebra," to which he made many important additions; and he also corrected several errors which had crept into the London edition. He was a good mathematician. He now resides in the City of Washington, and follows a line of business which is wholly different from his former pursuits. He is known there as the "King of the Lobby;" and as plain Samuel Ward, or Uncle Sam (as he is usually called). He gives the best dinners of any man in America. Not long since, on being subpoenaed to appear before the Pacific Mail Investigation Committee, he made an elaborate defense of the "Lobby;" and his arguments were most of them good and well sustained, but he took care to evade a discussion of the *shady* side of the subject. On being questioned about his splendid dinners, and their bad effects, he declared that, without a good dinner, a man could not say his prayers before retiring to rest; but, after partaking of such a dinner, he could go to bed and sleep like an angel.

Mr. Ward's father and grandfather, bearing the same name, were members of the once famous firms of "Prime and Ward," and "Prime Ward and King," the Wall street brokers.

All the most eminent mathematicians of America were contributors to "The Diary." Among them were Dr. Adrain the Editor, Dr. Bowditch, Prof. Theodore Strong, of Hamilton College, N. Y., Eugene Nulty, Benjamin Peirce, Benjamin Hallowell, (a Quaker, and a man as genial and full of humor as Samuel Ward), Marcus Catlin, J. H. Swale of Liverpool, Mathew Collins of Limerick, William Lenhart, Mary Bond of Fredricktown, Md., the only female contributor, O. Root, M. O. Shannessy A. M., John Capp, Dr. Henry J. Anderson, Charles Avery, and others.

"The Mathematical Diary" contained, besides solutions of problems, many important and valuable essays on the various branches of abstract science, and was the best mathematical serial that had as yet appeared.

The next periodical was "The Mathematical Miscellany" Charles Gill, Professor of Mathematics in St. Paul's Collegiate Institute, Flushing, Long Island, was the Editor, and it was published semi-annually at the Institute. Eight numbers were published, the first in February, 1836, and the last on Nov. 1st., 1839. It had a Junior and a Senior department. The former was for young students, and the latter was for proficients in Mathematics.

This periodical was ably conducted. The editor himself was one of the best Diophantists in America. His speculations on problems relating to Polygonal numbers were profound and interesting. Wm. Lenhart, who was also a Contributor to "The Mathematical Correspondent" furnished many original articles on the Diophantine Analysis. Professors Peirce and Strong gave integral answers to problems of the form $ax^2 + bx + c = \square$. They make use of the principle of Congruous Numbers, discovered by M. Gauss. Their solutions are the only examples of his method to be found in any American periodical. There are also a great many solutions of problems in all branches of mathematics, by the most distinguished scholars in America, among whom may be mentioned Profs. Theodore Strong LL. D. and Benj. Peirce, Professors Charles Avery and Marcus Catlin of Hamilton College, Clinton, N. Y., Messrs. George R. Perkins, O. Root, Wm. Lenhart, Lyman Abbot jr., Farrand N. Benedict, Gerardus B. Docharty, and others.

The next mathematical periodical was "The Cambridge Miscellany of Mathematics, Physics, and Astronomy," Edited by Prof. Benjamin Peirce and Joseph Lovering, Harvard University, and published quarterly. Four numbers were issued, the first in July, 1842. The writer has not seen this periodical, but it was undoubtedly conducted with the ability to be expected from the reputation of the Editors.

After an interval of fifteen years, J. D. Runkle A. M. of the Nautical Almanac office, Boston, proposed to establish a mathematical periodical on a new plan, which was approved by all the principal Educators and Mathematicians in the United States. This periodical was named "The Mathematical Monthly." The first number was issued Oct., 1858, and it was continued for three years. It was discontinued after Sept., 1861, by reason of the Civil war, which diverted the minds of men, in a great measure, from abstract subjects to the more pressing matters relating to the war.

The chief points of the plan upon which this periodical was conducted were: The publication of five problems in each number, adapted to the capacities of the younger students, to be answered in the third succeeding no. The insertion of Notes and Queries, short discussions and articles of a fragmentary character, too valuable to be lost; and lastly, Essays not exceeding 8 pages, on various subjects, in all departments of mathematics. Besides, there were Notices and Reviews of the mathematical works issued, both old and new. Among the most interesting articles are the Account of the Comet of Donati, with elegant descriptive plates, written by the Astronomical Professor of Harvard University, Vol. I. Nos. 2 and 3. A complete catalogue of the writings of Sir John Herschel, Vol. III. No. 7. Articles on the Indeterminate Analysis, by Rev. A. D. Wheeler of Brunswick, Maine, Vol. II. Nos. 1, 6, 12, and on the Diophantine Analysis, Vol. III. No. 11:

Other articles on the Diophantine Analysis, by Mr. Wheeler, would have been inserted if the "Mathematical Monthly" had been continued:

Economy and Symmetry of the Honey-bees' Cells," by Chauncey Wright, Vol. II. No. 9. Simon Newcomb gives several interesting "Notes on Probabilities. In Vol. II. No. 2, there is an article containing a complete list of the writings of Nathaniel Bowditch LL. D. accompanied with short sketches of the same, which is extremely interesting. Several articles and Reviews on the Hindoo Algebra are worthy of notice. There is also an exceedingly interesting and valuable article on the "Theorem of Pappus," which is proved to be incorrectly called the Theorem of Guldinus, by J. B. Henck. There are also many other valuable articles. This periodical is embellished by portraits of Nathaniel Bowditch LL. D., Prof. Benjamin Peirce and Sir John Herschel, which are finely executed.

Besides the periodicals above mentioned, there have been several minor works published; one of these, "The Schoolmaster," by Rev. Timothy Clowes D. D., and issued at Hempsted, L. I., in 1832. It continued only a year, and was noted chiefly by a controversy between two belligerent mathematicians, both of them now living, one in New York, and the other in Taunton, Mass. It was "nip and tuck" for a long time; but at length the "Taunton man" proposed a problem which the other could not solve, and thus he bore away the palm. They are now old men, and if this notice should fall under their observation, the contest of 43 years ago will readily be called to mind.

There have also been Almanacs issued in past times as well as at present, containing problems and solutions. The oldest of these is "Thomas' Almanac," published at Worcester, Mass., which has existed for more than 100 years. For many years it has contained problems to be solved in the year succeeding. "The Maine Farmer's Almanac," published at Hallowell Me., is of the same character. It was edited at first and for many years by Daniel Robinson. It was founded in 1818. In the same year, "Hutchins' Improved Family Almanac" was founded; David Young being Editor. After his death, Dr. Samuel H. Wright assumed the duties of Editor, and still remains such. He also edited "The Farmers' Almanac," and "The Knickerbocker Almanac." The Lodi Manufacturing Co. also published a "Farmers' Almanac." "The Antimasonic Almanac" was commenced by Edward Giddins, in 1828, at Rochester, N. Y. How long it continued the writer does not know. There are probably many other Almanacs unknown to the writer. All of these serials had more or less problems and solutions some of them problems only. It ought to have been noticed in its proper place, that John D. Williams became editor of the "Math'l Companion" in 1828, and continued it 4 years. It consisted wholly of prob's & solutions.

This periodical was evidently got up as a rival of *The Mathematical Diary*. His opponents were numerous, and the contest was carried on with some bitterness, till finally Mr. Williams issued his 14 famous "Challenge Problems," directed against all the mathematicians in America, excepting only Dr. Bowditch, Prof. Strong and Eugene Nulty. Six of these problems are impossible. Some of the others are somewhat difficult, but have all been solved by several persons.

Besides the *ANALYST*, for which this paper is a contribution, and which is devoted exclusively to mathematics, there are many periodicals at present in America which appropriate a portion of their space to mathematics.

"The Yates Co. Chronicle," a newspaper published weekly at Penn Yan, Yates Co. N. Y., by S. C. and E. Cleveland, has a mathematical department edited by Dr. Samuel H. Wright, containing problems and solutions in nearly every branch of mathematical science and is undoubtedly the best of its kind in the country. "The Railroad Gazette," published weekly at N. Y. and Chicago, has mathematical problems relating to the construction of Railroads, Engines, Cars, &c. There are also several monthly Educational periodicals which have a department devoted to mathematics. "The Schoolday Magazine," published at Philadelphia has a mathematical department which is ably edited by Artemas Martin Esq., of Erie, Pa. It has done much good to the class of advanced students for whom it was intended. "The Normal Monthly," edited by Prof. Edward Brooks at Millersville, Lancaster Co. Pa. has a mathematical department in which Artemas Martin has a series of articles on the Diophantine Analysis, which he well illustrates and in a style adapted to general comprehension. "Educational Notes and Queries," edited by Hon. W. D. Henkle at Salem, Ohio, has also a department for mathematical Notes and Queries which bids fair to be interesting and useful. There are also the "Illinois Schoolmaster," and Morton's Monthly, published at Chicago and Louisville respectively, which contain many excellent solutions of mathematical problems.

The above are all the serials, having a mathematical department which have come under the notice of the writer.

NOTE ON THE REACTIONS OF CONTINUOUS BEAMS.

BY MANSFIELD MERRIMAN, C. E., NEW HAVEN, CONN.

As a matter of purely mathematical interest I wish to give here, without demonstration, the relations between the reactions of continuous girders of equal spans resting on level supports.